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HEAD START EVALUATION AND RESEARCH CENTER, THE UNIVERSITY OF CHICAGO. REPORT A, MATERNAL INFLUENCES UPON DEVELOPMENT OF COGNITION.

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This project was designed to follow up a group of 163 mothers and their 4-year-old children, who were subjects in a study of the differential effects of middle class and lower class cognitive environments on Negro urban preschool children. The objectives of the followup project were: (1) the expansion of the investigation of cognitive input features of the home, (2) the prediction of the child's cognitive development and school achievement during his first 3 years of school from preschool data, and (3) the longitudinal analysis of the growth of cognitive abilities over these years. The data of this project was obtained by presenting to the child tests measuring cognitive abilities, impulsivity, and reading readiness; and, to the mother, tests measuring her attitudes about school, her intelligence level, and her flexibility of thought. Because of the longitudinal nature of the followup project, the data analysis is not yet complete. Available results indicate that some of the tests, like Kagan's measure of reflectiveness, discriminate between mothers according to social class, while some of the other tests do not. The same effect has been found for the tests administered to the children. Data analysis of the relationship between home environment and child performance in school was not yet complete. An appendix containing descriptions of tests used in the project follows the report. (WD)

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A. Maternal Influences Upon Development of Cognition

Principal Investigators: Robert D. Hess and Virginia C. Shipman
Project Director: Jere E. Brophy

This project was designed to follow up a group of 163 mothers and their four-year-old children who were subjects in a study of cognitive environments of urban preschool children. That study is now in the final write-up stage and deals with the socialization of cognitive behavior in preschool Negro children from both middle class and disadvantaged urban backgrounds. The theoretical issues are 1) the effects of early experience (especially cultural deprivation) upon emergence of cognitive ability; 2) the role of the mother in socializing cognitive behavior and achievement motivation; and 3) the role of linguistic styles and techniques of maternal control as mechanisms of exchange between culture and cognition.

The initial project focused upon the input features of the socialization process, especially those provided by the home context. The behavior of the mother, particularly in interaction with the child, provides (or fails to provide) the child with response repertoires of various kinds (linguistic, conceptual, motivational, et cetera), which are particularly appropriate for successful performance in a school setting. The project utilizes the concepts of *communication modes*, which may be elaborated or restricted, *family control systems*, which may be oriented toward norms, persons, or toward rational consequences, *maternal teaching style*, viewing the mother as a teacher and programmer of input, and *educability*, which is a heuristic term to indicate the confluence of cognitive skills, motivation for academic achievement, and socialization into the role of pupil in response to preschool maternal behavior and other features of the home environment. In this initial study, the central focus of the interview, testing and laboratory analysis of mother-child behavior and interaction was upon the cognitive components of maternal behavior. Research on mother-child interaction in the child's early years traditionally has ignored cognitive elements, concentrating on affective and disciplinary types of exchange within the mother-child dyad.

The basic study included 163 Negro mothers and their four-year-old children. This group was divided into four subgroups of approximately forty each, drawn from professional and managerial occupational levels (Group A), skilled work occupational levels (Group B), unskilled and semi-skilled occupational levels (Group C), and an additional group (D) from unskilled and semi-skilled occupational levels of mothers who were on public assistance. This last group was also one from which the fathers were absent - a condition that in the past has been a basic requirement in order to receive public assistance in the city of Chicago. These mothers were interviewed in the homes about their activities with the child, their daily schedules, the availability of cognitive and intellectual stimulation, and other features of the home environment that are thought to be related to cognitive development. Mother and child were then brought to the University for testing. Tests of intellectual ability and cognitive styles were given to both the mother and the child. In addition, they were asked to engage in an interaction situation which required that the mother teach the child three simple tasks that she had been taught by a project staff member. These mother-child teaching situations were observed through a one-way screen and were recorded on tape. The performance of the child was measured by the degree to which he was able to master the tasks presented by the mother. A number of reports are available from the project describing the theoretical rationale and findings in detail.

Summarizing the results, the data seem to indicate that the structure of the social system and the structure of the family shape communication and language and that language shapes thought and cognitive styles of problem solving. It appears fruitful to consider class differences in terms of differences in the availability of options in the mother's daily life. The lower-class mother's narrow range of alternatives is being conveyed to the child through language styles which convey her attitude of few options and little individual power and this is now being reflected in the child's cognitive development. A problem-solving approach requires reflection and the ability to weigh decisions, to choose among alternatives. The effect of restricted speech and a status orientation is to foreclose the need for reflective weighing of alternatives and consequences: the use of an elaborated code with its orientation to persons and to consequences tends to produce a cognitive style more easily adapted to problem-solving and reflection. The cognitive environment of the culturally disadvantaged child can be described as one in which behavior is controlled by status roles rather than attention to the individual characteristics of a specific situation and one in which behavior is not mediated by verbal cues which offer opportunities for using language as a tool for labelling and ordering stimuli in the environment nor mediated by teaching that relates events to one another and the present to the future. This environment produces a child who relates to authority rather than to rationale, who although often compliant is not reflective in his behavior, and for whom the consequences of an act are largely considered in terms of immediate punishment or reward rather than future effects and long range goals.

The follow-up study has as objectives: 1) the expansion of the investigation of cognitive input features of the home by the development of techniques for extending the study of mother-child interaction from previous laboratory studies to naturalistic observation in the home and/or school; 2) the prediction of the child's cognitive development and school achievement during the first three years of school, using data from the preschool years; and 3) the longitudinal analysis of the growth of cognitive abilities over these years. The limited vocabulary and conceptual development of the four-year-old child made it difficult to obtain adequate measures of cognitive and motivational behavior in the initial study. For this reason the procedure calls for retesting the children and mothers again before the child starts his first year of school and for subsequent testings during the first three years of elementary school experience. Because the original testing was spread out over a period of almost two years, the follow-up project requires considerable time to gather data on the children who participated in the study.

The prediction aspects of the study employ a range of cognitive measures -- Stanford-Binet I.Q.; several Piaget-type tasks assessing the child's capacity to distinguish external reality from subjective appearance under conditions of varying perceptual distortion (conservation of length, number and volume, generic constancy, class inclusion, ring-segment, dream interview); the Sigel Sorting Task to assess cognitive style; several measures of "impulsivity" (ability to sit still, one of Mischel's delayed reward questions, Kagan's Matched Figures Test to assess reflectiveness, and the Draw-a-Circle Slowly Task); the Lee-Clark Reading Readiness Test (or first grade test for the older children); and an experimental visual measure of preference for stimulus complexity developed in the initial study, as well as orientation toward school as expressed in teacher's grades and other measures of ability to cope with the social and authority relationships presented at school. Instructions for these tasks are given in the Appendix.

Additional data were obtained from the mothers, including present attitudes about her child's school experiences and measures of I.Q., reflectiveness, flexibility of thought, and motivational variables thought to be particularly relevant to those maternal behaviors assessed earlier. The WAIS Performance subtests (excluding Object Assembly) and Vocabulary subtest were administered to the mothers. (Verbal I.Q.'s had been previously obtained.) They were also asked to "draw a circle slowly" and were given a version of Kagan's measure of reflectiveness for older subjects. The items from the Need for Achievement, Need for Change, and Need for Introception and Need for Nurturance scales of the Edwards Personal Preference Record were read to all the mothers as was the James-Phares Locus of Control Scale, since many have a limited reading ability. Flexibility of thought, as measured by the Getzels-Jackson Verbal Uses Test, was also assessed. In addition, each mother-child pair was observed through a one-way screen for 15 minutes in a controlled free play situation to add to our previous laboratory measures of mother-child interaction (e.g., amount of maternal control, pressures for obedience, orientation to the task, specificity of information given) and to provide a measure of the child's manipulatory curiosity, initiatory behavior, and complexity of play. An overhead mike recorded the mother's and child's speech and the observer spoke into another synchronized tape recorder giving a running account of the mother's and child's actions.

Concentrated testing prior to entrance into first grade had already been funded, but additional funds were needed for coding and analyzing these data, for testing in the Chicago Public Schools in the autumn of 1966, for obtaining additional data during the year concerning the child's school records, and maintaining contact with our research group. Although we submitted a proposal to OEO for separate funding of this project, delays in the decision-making and budgeting process necessitated using a substantial portion of the E and R budget to continue operation of this project. Since this project is an ongoing one, with continued testing of the children at least through 1967-1968, the following is a progress report of work done to date rather than a final report.

In the summer of 1966, those children who were entering first grade in the fall were brought to the University with their mothers where both were administered the instruments described above (N=101). During December and January each seven-year-old subject (N=56) was seen at his school and given a Stanford-Binet Intelligence Test (Form LM) and a doll-play measure designed to tap attitudes toward the school and the child's perception of his role in the school milieu. Cooperation was obtained from every school involved, both in providing testing space and in approving release of school records of the children. (During prior home interviews with their mothers we

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secured signed parental permission for testing their children at school and obtaining the school records.)

In the summer of 1967 data collection for the first follow-up cycle (the summer before the child's entrance into first grade) was completed with the interviewing and testing of the remaining mothers and children at this level. An additional 102 mothers and children were seen for the second follow-up cycle during the summer, and this data collection is complete except for the five children who are presently in first grade. WAIS subtests were not readministered to the mothers since I.Q.s may be expected to remain fairly constant for adults over this three-year time span. Fifty-three of the original fifty-seven eight-year-olds were also brought to the University for readministration of the follow-up tasks with the exception of the Lee-Clark. Beginning in September and continuing through the present, all seven- and eight-year-old subjects are being seen at their school and given the Stanford-Binet and the doll-play interview. We expect to complete this testing in February. At that point only the collection of school grades and other data in June will remain for the completing of the second cycle (except for the five first grade children mentioned above).

Considering the lack of specific details collected earlier concerning our families, (e.g., name of father's employer), we were fortunate to have been able to locate essentially all our subjects when we started the follow-up testing. We now have contact with 160 of the original 163 subjects in the sample (one child died and two we have been unable to find). With the exception of five families who moved out of state (only one of whom we have been unable to locate and test) all reside in Chicago or a Chicago suburb.

Most of the data from the first follow-up cycle are in final form and are ready for analysis. The only exceptions are the Piaget conservation data and the play period observations, which are presently being coded and should be ready for analysis shortly. Scoring criteria for the Piagetian tasks are being finalized in collaboration with Dr. Lawrence Kohlberg.* Analysis of the other data is already under way and will be summarized in a report to OEO to be prepared by March 1. This report will include:

a. Discussion of the usefulness of variables measured during the preschool study (when the children were age four) as predictors of the measures of the children at the first follow-up cycle (before first grade). These predictor variables include both maternal and child behaviors assessed at that time.

b. Longitudinal data concerning stability over time on the curiosity measure (preference for visual complexity) and change over time on the Sigel Conceptual Sorting Task from age four to age six, thereby contributing to our knowledge about the continuity and sequence of growth.

c. Methodological discussions concerning the newly-developed or experimental measures on the children (Piagetian conservation tasks, impulsivity measures, Sears sex role preference instrument). Questions posed include the assessment of the degree to which the conservation tasks approach a hierarchically arranged Guttman scale in level of difficulty and the relationship between disparate "impulsivity" measures.

d. Mother-child similarity on equivalent measures (Kagan, Draw a Circle, Cognitive Sorting Tasks).

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*It should be noted that Dr. Irving Sigel, Director of Research at the Merrill-Palmer Institute, gave willingly of his time to discuss any scoring problems that arose with the data from the Sigel Cognitive Sorting Task.

Table 1 presents the social class means and standard errors for the Follow-up I variables, while Tables 2 and 3 present the intercorrelations among the maternal and child variables, respectively. These preliminary analyses of the data indicate that some variables do not discriminate at all by social class while others show extreme and progressive differences from the middle through the ADC groups.

Among the mother measures, average reaction time and number of errors on the Kagan, the anxiety score of the brief anxiety and depression scale, some of the Edwards scales, and the James-Phares Locus of Control measure all show a clear progression by social class in the mean levels. This is also true of the depression score from the brief anxiety and depression scale, since even though the means do not differ by very much the differences appear to be quite significant in view of the low variability. Among the Edwards scales, some social class trends are striking and in accord with expectation (such as the change and introception scale), while others have trends in the direction opposite to what had been expected (achievement and nurturance scales). The maternal I.Q. data is consistent with previous research findings with the middle-class mothers being slightly higher in verbal I.Q. and the lower-class mothers slightly higher in performance I.Q. These differences do not approach significance except in the case of the ADC mothers where performance I.Q. is four points higher than verbal I.Q.

The child data is less clear as there are few significant correlations among the various tasks. Moreover, among the impulse control measures three impulsivity measures (draw a circle slowly, gross motor control, and delayed reward) are unrelated to one another.

The difficulty with the gross motor control measure seems to lie in the measure itself, in that the great majority of the children were scored for 180 seconds, since they did not talk or leave their chair for full three minutes, and only a few were scored for less than 180 seconds. As a result the variable shows no class differentiation and no correlation with other measures. It is clear that this variable at least in its present form will be of little use. The draw a circle slowly measure, presumably reflecting the ability to control movement on demand, shows class trends and correlates with several other variables. The delayed reward measure must be counted as enigma at the moment. Although there is good differentiation between and within groups (45% of the children chose the delayed large reward while 55% opted for the small immediate reward), the correlations with other variables are quite low and usually not significant. This suggests that this variable is unique and is not simply another measure of general cognitive development. As has been suggested by others, it may also be a measure of trust, differential understanding of "later" and differential reinforcement value of the stimulus. The Kagan data for the child as well as for the mother support the interpretation of the reaction time measure insofar as they go. That is, the errors total seems to be more a measure of ability to do the task and correlates higher with I.Q. and with variables that correlate with I.Q. The reaction time measure correlates the same way (in opposite directions) but at a lower level, which is consistent with the interpretation of this measure as an index of cognitive styles (reflective-impulsive) as opposed to problem solving ability. However, the apparent methodological confusion in the measurement of the inhibition of impulse expression clouds the issue of the necessary relation of impulse control to the further development of thinking.

On the Sears Sex Role Preference Test the girls made more same sex choices among the pictures presented than the boys. We need normative data on the instrument itself before we can safely interpret this correlation, since it may simply represent a differential appeal in the stimuli which would cause girls to have higher scores rather than a true difference in sex role preference. The curiosity data, (visual preference for stimulus complexity), as in the pre-school analysis, shows little if any correlation with other variables. However it does show an interesting differentiation of the ADC children (along with many of the other variables also), with the ADC child spending considerable less viewing time. When the child data in general is scanned, it is clear that there has been a shift in the relative positions of the three lower-class groups with the upper-lowers and lower-lowers now being very similar on most measures and the ADC's being different from both of them (to greater or lesser significance on various measures).

The Lee-Clark and Sigel scorables measures behave as expected. However, the total scorables measure is less useful as a single index of ability than it was at the pre-school level, since the number of scorables now is much higher and there is little differentiation. The number of scorable responses obtained and the differential pattern by social class in these responses now allows us to make more clear-cut statements about categorization behavior as a cognitive style.

As mentioned above, these are but preliminary findings. When analyzed separately by sex of child and for the three lower status levels combined, other trends may appear. Moreover, there may be sex by social class interactions as, for example, in differential sex role preferential patterns for boys in father-present and father-absent lower class homes. The principal data analyses remain to be done to answer the prediction and longitudinal questions raised earlier.

Although exhaustive analysis of relationships between home environment variables obtained when the child was four and child data at age six had not yet begun, preliminary findings with the reading readiness scores suggest that the pattern will be similar to our previous findings with the child's preschool performance. It appears that our selected maternal measures will prove to be useful predictors of reading readiness and other follow-up cognitive measures of the children.

Project activity in the coming quarter will include completion of the intelligence testing and doll-play interviewing with the second grade children, preparation of second follow-up data for analysis, and possibly the beginning of the analysis fo these data. Investigation of the second follow-up cycle data will follow the organizational pattern outlined above for the first cycle, although there will be considerably more longitudinal data since many more measures will have been administered twice. Data from the Piagetian tasks are especially suitable for longitudinal analysis as the theory asserts an inherent sequence in the rules of logic by which children solve problems. It also will include data from a follow-up interview which contains information on changes in the families since the original interview and on the child's school-relevant activities before the first grade.

TABLE 1
MEAN PERFORMANCE ON THE FOLLOW-UP I VARIABLES ACCORDING TO SOCIAL STATUS LEVEL

	SOCIAL STATUS LEVEL											
	MIDDLE			UPPER-LOWER			LOWER-LOWER			ADC		
VARIABLE	N	MEAN	S. ERROR	N	MEAN	S. ERROR	N	MEAN	S. ERROR	N	MEAN	S. ERROR
Maternal:												
Draw Circle Slowly (Time in seconds)	39	41.49	9.124	41	42.76	5.099	36	48.58	7.369	39	30.54	3.583
Kagan Avg. Rtn. Time	39	14.93	1.038	41	12.92	0.979	36	12.71	0.877	39	11.12	0.778
Kagan # Errors	39	9.64	0.894	41	11.37	0.767	36	14.36	1.134	39	14.13	1.089
Anxiety Score	39	4.69	0.566	41	6.95	0.660	36	8.42	0.583	39	11.13	0.888
Depression Score	39	9.69	0.325	41	10.54	0.360	36	10.69	0.382	39	10.62	0.412
Edwards N-Ach.	37	13.51	0.656	41	14.37	0.551	36	14.92	0.658	38	14.71	0.529
Edwards N-Introception	38	17.29	0.605	41	15.20	0.622	34	15.59	0.622	37	15.38	0.620
Edwards N-Change	38	17.79	0.675	41	14.20	0.655	32	13.84	0.563	37	12.57	0.681
Edwards N-Nurturance	38	14.58	0.619	40	16.28	0.694	35	15.97	0.674	37	16.73	0.764
James-Locus of Control	11	37.82	1.762	10	45.50	3.673	19	51.95	1.894	16	51.62	1.316
WAIS Verbal IQ	40	109.40	1.770	42	91.79	2.138	40	82.48	2.148	41	82.42	2.125
WAIS Performance IQ	39	107.20	1.585	40	92.65	2.186	36	83.56	2.334	39	86.67	2.510
WAIS Full Scale IQ	39	109.33	1.568	40	91.80	2.122	36	82.08	2.279	39	83.82	2.271

TABLE 1 - CONTINUED

	SOCIAL STATUS LEVEL											
	MIDDLE			UPPER-LOWER			LOWER-LOWER			ADC		
VARIABLE	N	MEAN	S. ERROR	N	MEAN	S. ERROR	N	MEAN	S. ERROR	N	MEAN	S. ERROR
Child:												
Draw Circle Slowly (Time in seconds)	39	22.74	2.500	37	17.84	1.777	37	19.35	2.095	40	17.70	1.939
Gross Motor Control (Time in seconds	39	167.92	6.063	37	164.43	7.666	37	168.54	6.656	40	168.55	5.849
Delayed Reward	39	1.59	0.080	37	1.43	0.083	36	1.44	0.084	40	1.35	0.076
Kagan-Avg. Rtn. Time	39	5.76	0.325	37	5.08	0.365	37	5.46	0.584	40	4.05	0.228
Kagan # Errors	39	33.51	2.778	37	38.97	3.089	37	42.40	2.611	40	50.75	2.815
Sears Sex Role	39	4.97	0.182	37	4.95	0.263	37	4.92	0.240	40	4.58	0.202
Curiosity Task Complex Viewing Time	39	116.31	16.213	37	116.90	19.834	37	115.43	13.756	40	78.83	9.650
Total Viewing Time	39	218.30	32.199	37	218.92	37.497	37	210.67	24.559	40	149.42	18.717
Complex/Total Viewing Time	39	.542	0.010	37	.541	0.010	37	.546	0.013	40	0.53	0.009
Lee-Clark Total	39	53.03	1.301	37	49.27	1.207	37	45.89	1.726	40	45.65	1.522
Sigel Sorting Task Descriptive-Analytic	39	5.97	0.670	37	4.95	0.664	37	8.11	0.925	40	6.15	0.732
Descriptive-Global	39	3.38	0.315	37	3.43	0.371	37	2.78	0.378	40	3.42	0.397
Relational	39	5.15	0.544	37	4.81	0.509	37	3.35	0.543	40	4.75	0.497
Categorical	39	3.97	.442	37	3.54	0.459	37	1.62	0.301	40	2.40	0.414

TABLE 1 - CONTINUED

	SOCIAL STATUS LEVEL											
	MIDDLE			UPPER-LOWER			LOWER-LOWER			ADC		
VARIABLE	N	MEAN	S. ERROR	N	MEAN	S. ERROR	N	MEAN	S. ERROR	N	MEAN	S. ERROR
Child:												
Sigel Sorting Task												
Nonscorable Verbal	39	1.03	0.368	37	2.97	0.645	37	3.03	0.555	40	0.20	0.602
Nonverbal	39	0.41	0.216	37	0.27	0.153	37	1.11	0.556	40	0.00	0.096
No Sort	39	0.08	0.077	37	0.03	0.027	37	0.00	0.000	40	0.00	0.000
Sum Scorables	39	18.49	0.586	37	16.73	0.709	37	15.86	0.805	40	16.72	0.604
Sum Shifts	39	12.85	0.536	37	13.08	0.432	37	10.76	0.748	40	12.48	0.465
Age (In Months)	39	73.87	0.551	37	74.22	0.543	37	74.14	0.562	40	75.08	0.529

TABLE 2
INTERCORRELATION MATRIX FOR MATERNAL FOLLOW-UP I DATA

VARIABLES	N	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Draw Circle Slowly	155		12	-06	-14	03	18	06	-08	07	00	05	-02	03
2. Kagan-Avg. Rtn Time	155			-24	-12	02	05	01	02	03	-10	29	16	25
3. Kagan # Errors	155				26	05	02	-27	07	-04	09	-48	-54	-53
4. Anxiety Score	155					27	-11	-22	19	-27	12	-38	-34	-38
5. Depression Score	155						-02	-11	07	-15	04	-12	-14	-13
6. Edwards-N-Ach.	152							0	-11	-19	-02	03	-10	-03
7. Edwards-N-Introception	150								-15	-10	-02	36	23	33
8. Edwards-N-Nurturance	150									-16	00	-17	-11	-16
9. Edwards-N-Change	148										-11	25	19	24
10. James-Locus of Control	56											-25	-18	-22
11. WAIS Verbal IQ	163												77	92
12. WAIS Performance IQ	155													88
13. WAIS Full Scale IQ	155													

TABLE 3
INTERCORRELATION MATRIX FOR CHILDREN'S FOLLOW-UP I DATA

VARIABLES	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Draw Circle Slowly	153		-10	08	24	-28	-07	14	11	11	01	11	06	17	22	13	20
2. Gross Motor Control	153			05	04	05	03	11	12	-05	06	-11	09	-04	06	04	06
3. Delayed Reward	152				13	-08	01	02	02	-05	07	01	0	12	17	12	19
4. Kagan-Avg. Rtn. Time	153					-32	-01	19	19	01	0	04	09	14	17	15	26
5. Kagan # Errors	153						-10	-19	-18	-10	-04	06	-14	-10	-18	-11	-42
6. Sears Sex Role Pref.	153							-01	-01	-05	-13	02	16	-02	-02	11	02
Curiosity Task																	
7. Complex Viewing Time	153								93	06	-05	-01	04	-01	-04	04	05
8. Total Viewing Time	153									-07	-06	-03	04	-02	-07	02	02
9. Complex/Total Viewing Time	153										01	10	-03	0	04	06	15
Sigel Sorting Task																	
10. Descriptive Analytic	153											-17	-41	-43	36	-32	01
11. Descriptive Global	153												-18	01	17	34	-01
12. Relational	153													25	33	33	14
13. Categorical	153														21	30	40
14. Scorables	153															33	25
15. Shifts	153																12
16. Lee-Clark Total	153																

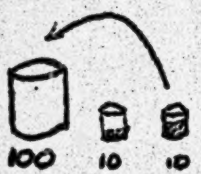
APPENDIX TO RESEARCH REPORT A - TASK DESCRIPTIONS

____

code sex age date tester

Materials: 1 100 ml beaker, 2 10 ml beakers, 1 5 ml graduate, 2 10 ml graduates one of which has been cut down at the top, ½ cup coke or liquid.

Seat child so that table top is at eye level.



1. (Two 10 ml beakers and one 100 ml beaker)
Now I'm going to put some coke in these glasses. After a while we'll drink some. (Pour coke in both 10 ml glasses, with more in one). You don't need to show me, but can you see I put more coke in one glass than the other?

_________ Yes

_________ No

When I say so, you can pick the one with more to drink. If you don't pick the one with more to drink, you won't get any this time. You'll get another chance to drink some later. Now, before you pick, I take this one (10 with more coke) and pour the coke all out into this one (100 ml beaker). Now look at them. (Pause). If you can show me the one with more to drink, I'll give it to you to drink.

_________ Picks correct 100 (ask Q's below)

_________ Picks incorrect 10 (ask Q's below)

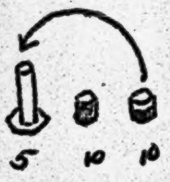
Did that one have more?

How could you tell?

(If says because empty was more:) But how can you tell now when it's like this (pointing to 100)?

(If says because it was more:) When was it more?

(Let child drink coke in glass he chose.)



2. (Two 10 ml beakers and one 5 ml graduate)
Now let's fill these two glasses. Now I fill this glass (one of 10's) up to the very top. I don't fill this (other 10) glass up. Now, see, I put more coke in one glass than the other. You don't need to show me but can you see that one glass has more coke?

_________ Yes

_________ No

When I say so, you can pick the one with more to drink. If you don't pick the one with more to drink, you won't get any this time, but you'll get another chance to drink some later. Now, before you pick, I take this one (10 with lesser amount) and pour the coke all out into this one (graduate). Now look at them. (Pause). If you can show me the one with more to drink, I'll give it to you to drink.

______ Picks correct beaker(Ask Q's below; then let child drink and go to 2a)

______ Picks incorrect graduate (Ask Q's below; then move to Q 3 or 4)

Does that have more?

How could you tell?

Show me how you could be sure?

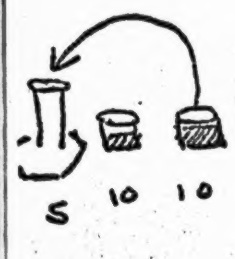
(If says because empty had less:) But how can you tell when it's like this (pointing to grad)?

(If says because it was more:) When was it more?

(If picked correct beaker, let child drink.)

(If incorrect on both Q 1 and 2, don't let child drink yet. Move to Q4.)

2a (If correct on Q 1 and correct on Q 2:)



(Two 10 ml beakers and one 5 ml graduate)
Now let's pour some more coke. Now I fill this glass (one of 10's filled to just below top of white dot). But I don't fill this (other 10) glass up. Now, see, I put more coke in one glass than the other. You don't need to show me, but can you see that one glass has more coke?

______ Yes

______ No

When I say so, you can pick the one with more to drink. If you don't pick the one with more to drink, you son't get any this time, but you'll get another chance to drink some later. Now before you pick, I take this one (10 with greater amount) and pour the coke all out into this one (graduate). Now look at them. If you can show me the one with more to drink, I'll give it to you.

______ Picks correct graduate (ask Q's below, then let child drink)

______ Picks incorrect beaker (ask Q's below, go to 2b)

Does that have more?

How could you tell?

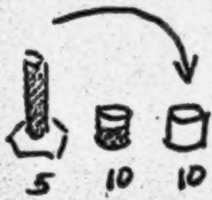
Show me how you could be sure?

2b. (If incorrect on 2a)
Which one had more before I poured it?

_____ Picks correct empty beaker

_____ Picks incorrect beaker with coke

Now, this one (point to graduate) has more coke in it. This one (point to beaker with less coke) has less. See (pouring graduate back into beaker), it's more. Then this (pointing to beaker with more) has more. Now, I pour it back (pour from beaker with more into graduate). Now look at them (pause). Now, you take the one with more coke to drink.

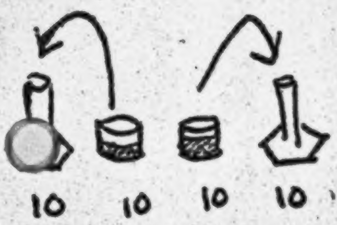


_____ Picks correct graduate (let child drink choice and terminate test)

_____ Picks incorrect beaker (ask Q's below)
Does it really get to be less when I put it in here (point to graduate)? How does that happen?

(Let child drink his choice and terminate test.)

3. (If picked correct 100 on Q 1 and incorrect graduate on Q 2:)



(Two 10 ml beakers and two 10 ml graduates, one of which has been cut to a shorter height) Now let's pour some more coke. (Pour coke into two 10 ml beakers, with more in one) Can you see that I put more coke in one glass?

_____ Yes

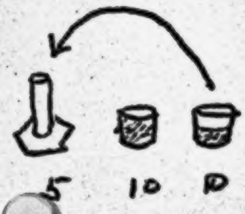
_____ No

When I say so, you can pick the one with more to drink. If you don't pick the one with more to drink, you won't get any to drink this time. You'll get another chance to drink some later. Now, before you pick, I take this one (10 with less) and pour it into this one (taller graduate), and I take this one (10 with more) and pour it into this one (shorter graduate). Now look at them. (Pause) If you can show me the one with more to drink, I'll give it to you to drink.

_____ Picks correct short graduate (ask Q below)

_____ Picks incorrect tall graduate (ask Q below)
Did you pick the one with more to drink?

(Let child drink)



a. (Two 10 ml beakers and 5 ml graduate)
Now let's fill these two glasses. Now I fill this glass (one of the 10's) up to the very top. I don't fill this (other 10) glass up. Now, see, I put more coke in one glass than the other. Can you see that one glass has more coke?

______ Yes

______ No

When I say so, you can pick the one with more to drink. If you don't pick the one with more to drink, you son't get any this time, but you'll get another chance to drink some later. Now, before you pick, I take this one (10 with lesser amount) and pour the coke all out into this one (graduate). Now look at them. (Pause). If you can show me the one with more to drink, I'll give it to you to drink.

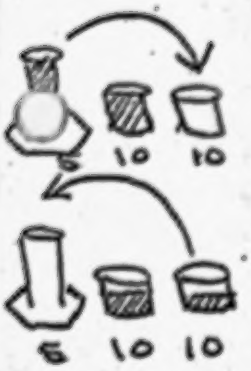
______ Picks correct beaker (Let child drink)

______ Picks incorrect graduate (go to Q4)

4. (If picked incorrect graduate:) Which one had more before I poured it?

______ Correct 10 with coke

______ Incorrect empty 10



See, this one (point to beaker) has more coke in it. This one (point to graduate) has less. See (pouring graduate back into beaker), it's less. Then this (pointing to beaker with more) has more. Now I pour it back (pour from beaker with less into graduate). Now look at them. (Pause). Now, you take the one with more coke to dring.

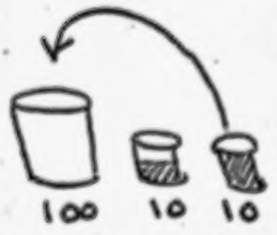
______ Picks correct beaker (Let child drink)

______ Picks incorrect graduate (Ask Q following)
Does it really get to be more to drink when I put it in here (point to graduate)?

How does that happen?

(Let child drink his choice.)

5. (If picked incorrect 10 ml beaker on Q 1:)



Two 10 ml beakers and one 100 ml beaker)
Now let's put some coke in these galsses. (Pour coke in both 10 ml beaker with more in one.) You don't need to show me, but can you see that I put more coke in one glass than the other?

______ Yes

______ No

When I say so, you can pick the bigger one to drink. If you don't pick the one with more to drink, you won't get any this time. Now, before you pick, I take this one (10 with more) and pour the coke all out into this one (100 ml beaker). Now look at them. (Pause). If you can show me the one with more to drink, I'll give it to you to drink.

______ Picks incorrect 10 (Go to Q 6)

______ Picks correct 100 (Ask Q's below)

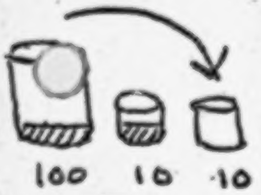
How could you tell?

(If say empty had more): But how could you tell when it's like this (point to 100)?

(Let child drink and terminate test)

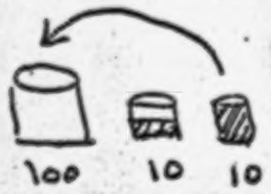
6. (If picked incorrect 10 or Q5:)

Which one had more before I poured it here (point to 100)?



______ Correct empty 10

______ Incorrect 10 with less



See, this one (point to 10 with less coke) has less to drink. See, (pouring coke from 100 ml beaker back into 10 ml beaker) this is more. Now, I pour it back (pour from 10 with more into 100). Now look at them. (Pause). Now, you take the one with more coke to drink.

______ Picks correct 100 (Let child drink).

______ Picks incorrect 10 (Ask Q's below)

Does it really get to be less to drink when I put it in here?

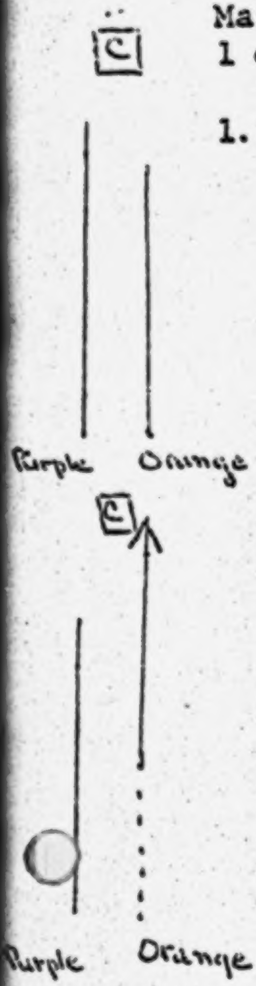
How does that happen?

(Let child drink his choice.)

PRE-SCHOOL PROJECT, SUMMER 1967

Code Sex Age Date Tester

Materials: 4 pairs of 4" and 4¼" gum sticks. Three pairs are 2 colors, 1 pair is 1 color.



1. (One orange 4" and purple 4¼", placed parallel to child's line of sight, with ends farthest from child aligned)
   Here are two sticks. One is bigger and longer than the other. You don't need to show me, but can you see that one is bigger and longer than the other?

   Yes No

   When I say so, you can pick the bigger and longer. One is to keep or chew. If you don't pick the biggest one, you won't get gum this time. You'll get another chance to get gum later. Before you pick I put them like this (Place finger in center of orange stick and slide it toward child so that it extends about ½" beyond other stick.)

   Now, look at them. If you can show me the biggest and longest one, I'll give it to you to chew after while

   ______picks longer purple (Let child take gum and then move to Q3)

   ______picks shorter orange (Ask the following and then move to Q2)

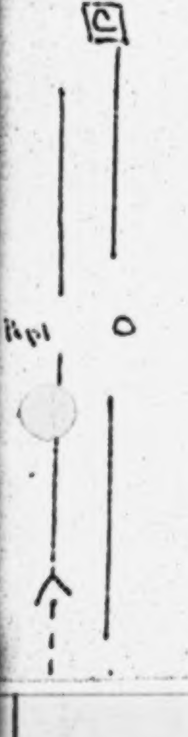
   How could you tell it was bigger?

   (If says "I looked at it," or I saw this was biggest," or similar ambiguous response which could refer to remembrance of which was bigger prior to advance, then ask following Q:)

   When did you see it (look)?

   (If says "I measured," or demonstrates by measuring, replace in advanced position and ask following Q:)

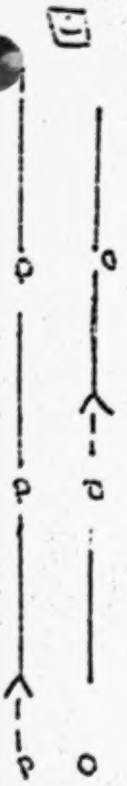
   But how can you tell when its like this?



2. (Give this question only if child picked shorter orange on Q1)
   (If sticks have been moved so that orange stick is not advanced toward child, replace them in this postion)
   You told me this was the biggest one (point to orange)
   (Place finger in center of purple stick and move it toward child so that it exte
   about ½" beyond other stick)
   Now show me the big one.

   ______picks longer purple (move to 2a)

   ______picks shorter orange (move to 2b)



a. (If chose longer purple in 2 above. Replace sticks in original position, with ends farthest from child aligned, and then move orange stick toward child so that it extends ½" past purple)

Before you said this (point to orange) was biggest.

(Move purple stick toward child so that it extends ½" past orange)

Now you say this (point to purple) is bigger. Do they really change bigness?

How is that (How does that happen)

(Move to Q5)

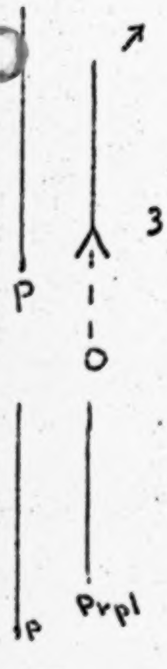
b. (If shorter orange was chosen in 2 above. Move orange stick toward child so that ends of stick farthest from child are aligned)

You said this was biggest (point to orange). Is it biggest now?

Do they really change bigness?

How is that (ie, how does that happen?)

(Move to Q5)



3. (Give this Q only if child picked longer purple on Q1)

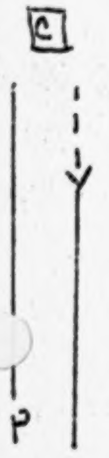
(Take two other sticks of gum, one 4¼" pink, one 4" purple. Place them parallel to child's line of sight, with ends closest to child aligned)

Here are two more sticks of gum. One is bigger and longer than the other. You don't need to show me, but can you see that one is bigger and longer then the other?

Yes No

When I say so you can pick the bigger and longer one to keep or chew. If you don't pick the biggest one, you won't get gum this time. You'll get another chance to get gum later. Now before you pick, I put them like this.

(Place finger in center of purple stick and move it away from child so that it extends about ½" beyond the pink stick.)



Now look at them. If you can show me the biggest (and longest) one, I'll give it to you to chew after a while.

______picks longer pink stick (move to Q4c after asking the following Q)

______picks shorter purple stick (move to Q4 after asking the following Q)

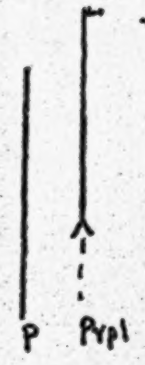
How could you tell it was Bigger?

(.. says "I looked at it," "I new this was biggest " or similar amb

(if says "I looked at it," "I saw this was biggest," or similar ambiguous response which could refer to remembrance of which was bigger prior to advance, ask:)

When did you look (see it)?

4. (Start here only if picked shorter purple on Q3)
(If pieces have been moved so that purple stick is not advanced away from child, replace in this position)



You told me this (point to purple) was the biggest one. (Place finger in center of shorter purple stick and move it toward child so that it extends ½" beyond other stick)

Now show me the big one

_____picks longer pink

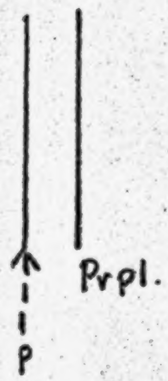
(Replace sticks in original position, with ends closest to child aligned, and then, while talking, move purple away from child) Before you said this (pt. to purple) was biggest. Now (move pink stick so it extends ½" beyond purple) you say this (pt. to purple) is bigger. Do they really change bigness?

How is that? (ie, how does that happen)

(Move to Q5)

_____picks shorter purple

C



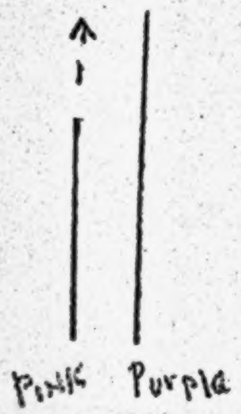
b. (Move pink stick toward child so that ends of sticks close to child are aligned)
You said this (pt. to purple) was biggest. Is it biggest now?

Do they really change bigness?

How is that?

Move to question 5

C



c. (Point to pink stick) This follows Q3 if said long pink was biggest.
You said this is biggest.
(Place finger in center of short purple stick and move it toward child so that the end nearest the child extends ½" beyond other stick)
Now show me the big one.

______Picks longer pink stick: (move to Q 5)

______Picks shorter purple stick (move to 4D)

d. (Replace sticks in original position, with ends closest to child aligned.) Before (move purple away from child so it extends $\frac{1}{2}$" beyond pink) you said this (point to pink) was biggest.
Now (move purple toward child so it extends $\frac{1}{2}$" beyond pink at end closest to child) you say this (point to purple) is biggest. Do they really change bigness?

How is that? How does that happen?

Move to Q5

5. (One 4" pink, one $4\frac{1}{4}$" orange placed parallel to child's line of sight, with ends aligned in accordance with which way he is seeing illusion, i.e., if incorrect and picked orange on Q 1, align ends farthest from child; if incorrect on 3 and picked purple, align ends closest to child; if correct on 1 and 3, align ends closest to child if boy and farthest if girl)

Here are two candy sticks. See, one is bigger, one is longer? When I say so, you can pick the bigger one to keep or to eat. If you don't pick the biggest one, you won't get gum this time. You'll get another chance to get gum later. Now, before you pick, I put them like this. (Bend orange stick so that a straight line drawn from end to end would be about 3 3/4" keeping alignment at one end with straight stick and not picking up from table.)

Now look at them. If you can show me the biggest one, I'll give it to you to eat after while.

______Picks correct orange

______Picks incorrect pink

Go to Q6, All Children.

C

6. (One 4", one $4\frac{1}{4}$" of the same color, randomly arranged, non-parallel) Here are two gum sticks. Show me the bigger one.

______Picks longer stick

______Picks shorter stick

______Measures

Show me how you can tell which is bigger.

How can you make sure?

PRE-SCHOOL PROJECT, SUMMER 1967

____
code sex age date tester

The following a~~gg~~rrangement should be prepared before bringing the child into the room:

A. Two 14" pizza plates placed adjacent on a table. Plate to child's left has 6 M&M's of the same color equally spaced in a 12" line parallel to child's line of sight. Plate to child's right has 5 M&M's of the same color as the first, equally spaced in an 8" line parallel to the first line.

B. Two 14" pizza plates in another location, also adjacent to one another. Plate to child's left has 5 M&M's of the same color, equally spaced in a 8" line parallel to child's line of sight. Plate to child's right has 6 M&M's equally spaced in a 4' line, parallel to the first line.

1. (Lead child to first set of plates A)
Here's some candy. One plate has more than the other plate. When I say so, you may pick the plate with the most candy--the one that has more to eat--to keep or to eat. If you don't pick the one with the most candy, you won't get any candy this time. You'll get another chance later. Now if you can show me the one that has more candy, I'll give it to you to eat.

______ Chooses 5

Counts

______ Chooses 6

(If counts correctly or chooses correctly)
That's right. This one (point to plate with 6) has most. Now watch. I'm going to put them like this (rearrange 6 into shorter 4 1/2" line). Now look at them carefully. Now quickly show me the one that has more candy.

______ Chooses 5

______ Chooses 6

How did you know that was most?

(Let child take candy he chose.)

2. (Lead child to second set of platesB)
Now here's some more candy. One plate has more than the other plate. When I say so, you may pick the plate with the most candy--the one that has more to eat--to keep or to eat. If you don't pick the one with the most candy, you won't get any candy this time. You'll get another chance later. Now if you can show me the one that has more candy, I'll give it to you to eat.

______ Chooses 5
Counts
______ Chooses 6

Now how could you tell which had the most candy:

(If does not count:) If I thought this (child's non-choice) had more, how could you show me it doesn't?

(If still does not count:) Could you count them?

So which has more?

3. (If failed Q1 or Q2) (Spread out 6 into 12" line as counting them). See, there are 1, 2...5 here, and 1,2...6 here. This one (plate with 6) has most. Now watch. I'm going to put them like this (rearrange 6 into shorter 4 1/2" line.) Now look at them carefully. Now quickly show me the one that has more candy.

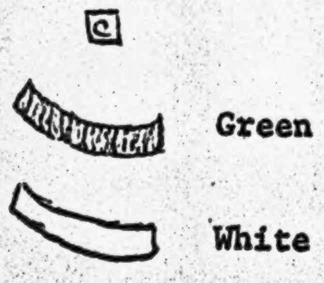
______ Chooses 5

______ Chooses 6

How did you know that was most?

____
Code Sex Age Date Tester

Materials: 4 cookies in the shape of ring segments, one each white, green, red, blue, with white 1/8" shorter.



1. A Here are two cookies (large green closest to child, and small white on top). Look at them. Can you see one is bigger and has more to eat than the other? When I say so, you may pick the one with more to eat. If you don't pick the one with more to eat, you won't get a cooky this time. You'll get another chance later. Now before you pick, (place white on bottom closest to child) look at them. If you can show me the one with more to eat, I'll give it to you to eat.

________ chooses bigger top green: Ask B, then let child take cooky and move to Q3.

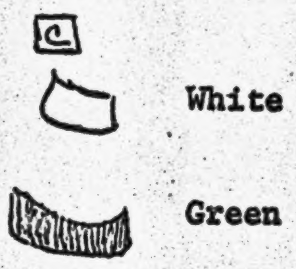
________ chooses smaller bottom white: Ask B, then move to Q2.

B 1) How could you tell that was more to eat?

2) Is one bigger? ______ if yes: Which is bigger? ___G ___W

How can you tell?

______ if no: What happened?

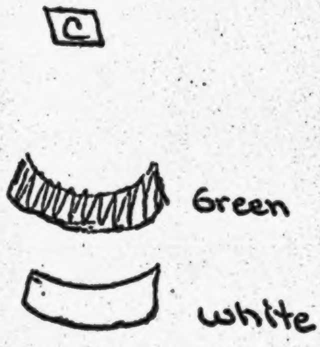


2. A (If chose smaller bottom white on Q1A) Now look, here's the one you picked. Now I put it here (place white on top away from child). Does it still have more to eat than the other one? Or does this one (point to green) have more to eat now?

________ chooses top white: Move to 2 C.

________ chooses bottom green: Move to 2B.

B 1) (If said bottom green had more to eat) How is that, how could you tell?



2) Which had more to eat when this (point to white) was here (point to space below green while pointing to white)?

_____ if white: Did it really change: Did it really get to be more to eat?

_____ if green: How is that? (move green back to top) Here is the way it was before. Does it have more to eat now?

(Let child take cooky and move to Q3)

C 1) (If said top white had more to eat, i.e. conserved choice)
How did you know this has more to eat?

2) Is one bigger? ______ if yes: Which is bigger? ___G___W

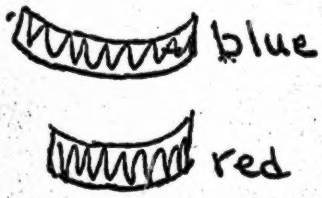
How can you tell?

if no: What happened?

(Let child take cooky and go to Q3)

3. A Here are two more cookies. (Two cookies of the same size, blue on bottom closest to child, red on top) You can pick the one with more to eat when I say so, Now this is harder. Look at them. Now before you pick I change their places. (Switch blue bottom to top) Now look at them. Which has more to eat?

C



_______ chooses equal blue top Ask B, then go to Q4

_______ chooses equal red bottom: Ask B, then ask C

B How did you know, how could you tell?

C (Ask this only is chose red on 3A) Which had more to eat when this (point to red) was here (point above blue while pointing to red also)?

_____ (says red had more:) Here's the way it was before (move blue below red closest to child). Does it have more to eat now?

______ if yes: (go to Q4)

_______ if no: Did it really get to be more to eat?

______ if yes: Did it get bigger? ___Yes ___ No
(Move to Q4)

______ if no: What happened? (move to Q4)

______ says blue had more: Did this (point to red) really get to be more to eat?

______ if yes: Did it get bigger? ___Yes ___ No.

______ if no: What happened? (move to Q4)

4. Look, it looks like they change (Switch red back and forth several times, leaving it on top if red was last chosen as more, and on bottom if blue was last chosen as more). Which has more to eat?

   Is one bigger?

   What happens? Does it really change from big to small when I move it or what?

5. Show me how you can tell which is really the big one?

   (If no measuring) If I thought this (child's non-choice) is the bigger one, how could you show me it's not?

   (If no measuring yet) Can you measure them?

   (If still no measuring) Can you put them together to see which is bigger and has more to eat?

Measurement: Some systematic adjustment of the position of the two objects for comparision purposes. Note whether child does spontaneously - or in response to a particular question:

a. superimposes
b. realigns cookies in some way, or checks alighnment by putting finger at edges
c. spontaneously uses verbal concept of measuring
d. pushes together
e. compares end points of smaller one
f. uses hands to measure
g. notes apparent end discrepancy or clearly measures long one of bottom cooky with short one of top cooky.

PRE-SCHOOL PROJECT, SUMMER 1967 Generic Identity Picture for

____

code sex age date tester

Level

0 (1. Picture 1 only: If this cat really wants to be a dog, can it?

If no: why not?

If yes: would it be a real dog?

(2. Pictures 1 & 2: If this cat barks like a dog, what would he be? Would it be a cat or dog?

1 If dog: would it be a real dog then?

Why is that?

(3. Pictures 1& 3 only: If this cat had its whiskers cut off like a dog does, what would it be? Would it be a cat or dog?

If dog: would it be a real dog then?

Why is that?

(4. Pictures 1 & 4: What if this cat has his whiskers cut off, and barks like a dog? What would it be? Would it be a cat or dog?

2 If dog: would it be a real dog then?

Why is that?

(5. Pictures L & 5: This cat meows -- it doesn't bark -- but if it has its whiskers cut off and his head is like a dog, what would it be? Would it be a cat or dog?

If dog: would it be a real dog then?

Why is that?

3 (6. Pictures 1 & 5: What if this cat has its whiskers cut off, its
(head like a dog, and barks like a dog -- what would it be?
Would he be a cat or dog?

If dog: would it be a real dog then?

Why is that?

PRE-SCHOOL PROJECT, Summer 1967

code sex age date tester

Materials: 4 brown M&M's, 1 white mint

1. Look, here is some candy. Some are chocolate candy, (give child an extra chocolate M&M to eat). One is mint candy (give child extra mint to eat).

   Are these chocolate candy? Yes No
   Is this mint candy? Yes No

   Now I'm going to have you pick some, and you must pick the most you can. If you don't pick what has more to eat, you won't get any candy this time. Now, pick either all the chocolate or all the candy. Which has more to eat?

   Candy Chocolate

   Why did you pick that?

   Which are there more of, chocolate or candy?

   Why is that?

2. Put all the candy in my hand. Correct Incorrect

   Put all the chocolate in my hand. Correct Incorrect

3. Is all the candy chocolate? Correct No Incorrect Yes

   Is all the candy mint? Correct NO Incorrect Yes

   Is some of the candy chocolate? Correct Yes Incorrect No

   Is some of the candy mint? Correct Yes Incorrect No

4. a. Now, listen carefully. If you took some of the chocolate away, would there be any chocolate left?

   Yes No

   b. If you took all of the chocolate away, would there be any chocolate left?

   Yes No

   c. If you took all the chocolate away, would there be any candy left?

   Yes No

   d. If you took all of the candy away, would there be any chocolate left?

   Yes No

5. Then is there more candy or more chocolate?

Why do you say there is more______________________?

6. What kind of candy is here?

7. 7. You take either all the candy or all the chocolate, whichever is more.

All Candy Chocolate Mint

Dream Interview

Code Sex Age Date tester

Introduction:

"You know what a dream is, don't you? Do you dream sometimes during the might?"

"Can you have a dream if you stay awake and don't go to sleep?"

(If he says he does not dream, go on to 5)

(If he says he dreams, ask:)

"What did you dream about last time: tell me a dream you had."

"What happened after the dream was over? What did you think and do?"

3. a. "What happened to the (object) after you woke up? Where did it go; where was it after you woke up?"

(If it disappeared ask:) "Could you see it leaving?"

(If it hadn't disappeared ask:) "Could you see it when you woke up?"

"When you see a dog in a dream, is it the same as when you are awake at night and see a dog?"

2. a. What is this? (picture of a dog)__________________

Is this a real dog you see here, or is it a picture, just something that looks like a

(If real:) Can this dog you see here bark or run?

3. c. Was the (object________) you saw in your dream just pretend, just something tha looked like a (object), or was it a real (object)?

3. d. Was the (object) in your dream really there where you were really close to you, or did it just seem to be there?

(If really there:) Could you touch the (object) and (smell, or other appropriate sense) it?

5. The Origin of the Dream

"Tell me, where does a dream come from?"

"Where are dreams made, where do they come from?"

"Do they come from inside you or outside of you?"

"Who makes the dreams come out?"

"Is it you or is it somebody else?"

6. Location of the Dream

"While you are dreaming, where is your dream, where does it go?"

"Is it inside of you or in your room?"

(If the dream is in the head, in the thoughts, etc. (thus internal and not external) say:)

"If we could open your head while you are dreaming, if we could look into your head, could we see your dream?"

If not, why do you say that we could not see your dream?"

7. (If the dream is in the room on the wall, close to his eyes, under the bed, etc., say:)

"Is it only that the dream seems to be in your room or is it really in your room?"

If not really in room: "Where is the dream then?"

4. "If your mother is in your room while you are asleep and dreaming, can she also see your dream?"

Why not?

(If not): "How about me--could I see your dream if I were in your room while you were dreaming?"

8. Substance of the Dream

"What is a dream made of?"

"Is it made of paper?"

"Then, what is it made of?"

"Can we touch dreams?"

"Is a dream a thought or is it a thing?"

(If he says he didn't dream at beginning, return now to introduction and ask again to tell about a dream he had.)
10. (If the child still says he did not dream, ask him:)

"Let's make believe that you dream during the night about a monkey. Would it just seem that the monkey was there,or would the monkey really be there?"

"Let's make believe you dream about a monkey during the night. What would make you dream about thet, why would you have that dream?"

"Then do you know why we dream, why there are dreams?"

9. "When you had the dream about the (object), why did you have that dream? What made you have that dream?"

"Then do you know why we dream, why there are dreams?"

Scale Score
1. Know what a dream is.
2. Says picture of dog is not real
3. Dream object is not real
    a. partly aware of unreality of dream
    b. fully aware that dream is not real and consistent in saying this.
4. Dreams are not visible to others.
5. Dreams do not originate in the external physical world.
6. Thinks dreams may take place inside.
7. Sure dreams take place inside.
8. Dreams are not material things.
9. Dreams are caused in a purely subjective or immaterial fashion by the child himself.

PRE-SCHOOL PROJECT

FOLLOW-UP STUDY, SUMMER 1967

Child # ____________________
Time of Day ________________
Date _______________________
Examiner ___________________

DELAYED REWARD PROTOCOL

We are finished now, and since you've been a good boy (girl), I would like to give you some candy. (Show one of each size.) Is one more to eat? Show me the big one with more to eat.

Correct   Incorrect

I don't have enough of these big ones with me now so I can't give it to you now, but I do have a little one. You can either have this little one right now, or if you want, I will get a big one and give it to you when it's time for you to go home. Which would you like? Would you like this little one right now, or would you like to wait until time to go home and have the big one? (Repeat or reward as necessary to make sure the child is aware of the choice. Do not, however, try to talk him out of any choice he makes.)

_____ Picks small now

_____ Picks big later

Why did you pick that?

At time big candy is given to the child: Do you remember what I told you? What did I say?

If says wants big one now: I can't give you this one because it belongs to somebody else. I'll get one; just like it for you if you want to wait until it's time to go home. Now, you can either have this little one right now, or if you wait, I will get a big one and give it to you when it's time for you to go home.

PRE-SCHOOL PROJECT

FOLLOW-UP STUDY, SUMMER 1967

Child # ____________________
Examiner ____________________
Date ____________________
Time of day ____________________

IMPULSIVITY PROTOCOL

Have the child turn his chair around facing blank wall and say, "Now, I would like to see how long you can sit very quietly without moving at all. Just sit and don't move and don't talk. Let's see how long you can sit without moving or talking." (This should be said in a pleasant, quiet tone of voice.)

SCORING - use stopwatch

a) Record the second at which the child makes his first movement, and place the number "1" next to the description of that movement. Thereafter, serially number each movement. If none of the following descriptions fit, writ write in a description of the child's movement.;

Getting up ______________________________

Walking ______________________________

Turning around (body off chair) ____________________

Head moving ______________________________

Trunk moving ______________________________

Leg and/or foot moving ____________________

Arm and/or hand moving ____________________

Talks (record response) ______________________________________

The first time the child either leaves his chair or talks; or after 180 seconds say, "That's very good. You can turn around now."

At end ask child A) "How long did you sit?"

B) "What did you think about while you sat?"

Briefly describe his behavior during the test.

DELAYED RECALL OF DESIGNS

"I am going to show you a design for a few seconds. Then I'm going to take it away and you will have to remember what it looked like. After a few more seconds, I will show you a whole group of designs that look something like the first one and you must point to the one that is exactly the same as the one that you first saw. Let's do some for practice."

(There are two practice items. If S makes two errors, E points out the correct answer. If after both practice items S does not understand the concept, then E will repeat the practice items.)

E shows the design for 5 seconds (and then turns the page and shows the blank for 15 seconds.) Then E turns to the page with the 12 stimuli. E times the subject's response time (to the half second) to the first response. E also codes the total number of errors for each item and the order in which they are made. If S is correct, E will praise. If S is incorrect, E says, "No, that is not the right one. Try again." (thus creating minimal anxiety). E continues to code S's responses (not times) until S gets the stimulus correct.

NOTE: On use of the stopwatch, timing is more accurate if E starts from 0 for each of the intervals (5 seconds, 15 seconds, time to first response). If E tries to turn pages at 5 seconds and again at 20 seconds by the watch, the time given to the child may not be accurate.

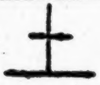
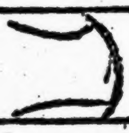
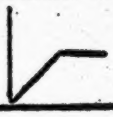
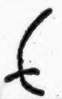
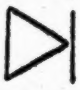
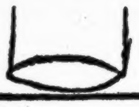
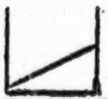
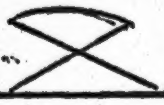
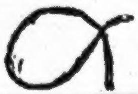
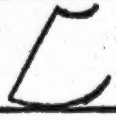
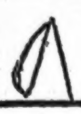
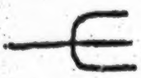
COGNITIVE STYLE PROJECT

DELAYED RECALL TEST

Name____________________________ Sex___________ Age_____ School__________

Date____________________ Session________________ Examiner__________________

RESPONSE LOCATION - TIME

Item	Figure												
1.		1	2	3	4	5	6X	7	8	9	10		
2.		1	2	3	4	5	6	7	8X	9	10		
3.		1	2	3	4X	5	6	7	8	9	10	11	12
4.		1	2X	3	4	5	6	7	8	9	10		
5.		1	2	3	4	5	6	7X	8	9	10		
6.		1X	2	3	4	5	6	7	8	9	10		
7.		1	2	3	4	5	6	7	8	9X	10	11	12
8.		1	2	3X	4	5	6	7	8	9	10		
9.		1	2	3	4	5	6	7	8	9	10	11	12X
10.		1	2	3	4	5X	6	7	8	9	10	11	12
11.		1	2	3	4	5	6	7	8	9	10	11X	12
12.		1	2	3	4	5	6	7	8	9	10X		

Kagan (revised: November 1961)

PRE-SCHOOL PROJECT

FOLLOW-UP STUDY, SUMMER 1967

INSTRUCTIONS FOR DRAW A CIRCLE SLOWLY

Materials: paper 8 1/2 x 11", primary pencil

Directions:

THIS IS A CIRCLE (E draws a standard 1 1/2" circle). I WANT YOU TO DRAW ONE FOR ME (let child draw a circle; make no reference to size; correct child only if shape is very wrong).

THIS TIME I'D LIKE YOU TO DRAW IT AS SLOWLY AS YOU CAN. (E demonstrates by drawing a line slowly). TAKE ALL THE TIME YOU WANT, AND SEE HOW SLOWLY YOU CAN DO IT.

(Record time taken to complete the circle. If child has not completed circle at end to ten minutes, terminate by saying, "That's fine. You can stop now.")

(If child stops in mid-circle, record time; say: "Keep drawing and don't stop until the circle is all done. Go as slowly as you can, but don't stop." Record time again until circle is completed, summing for total time.)

Note: Draw a Circle and Curiosity were done after the break so that the response times would not be affected by any undue restlessness.

THE COGNITIVE ENVIRONMENTS OF URBAN PRE-SCHOOL CHILDREN

Robert D. Hess, Principal Investigator

MANUAL OF INSTRUCTIONS
FOR ADMINISTERING AND SCORING
SIGEL CONCEPTUAL STYLE SORTING TASKS

The measures described in this manual were developed in the project, Cognitive Environments of Urban Pre-School Children, supported by: Research Grant #R-34 from the Children's Bureau, Social Security Administration, and the Early Education Research Center, National Laboratory in Early Education, Office of Education, both of the U.S. Department of Health, Education, and Welfare; the Division of Research, Project Head Start, U.S. Office of Economic Opportunity; the Ford Foundation Fund for the Advancement of Learning; and grants-in-aid from the Social Science Research Committee of the Division of Social Sciences, University of Chicago.

THE COGNITIVE ENVIRONMENTS OF URBAN PRE-SCHOOL CHILDREN

The research sample for the Cognitive Environment Study was composed of 163 pairs of Negro mothers and their four-year-old children, from three socioeconomic classes, defined by father's occupation and parents' education: upper-middle, professional and executive, with college education; upper-lower, skilled and blue collar, with high school education; lower-lower, semiskilled and unskilled, with no greater than tenth-grade education; a fourth group included father-absent families living on public assistance, otherwise identical to the lower-lower class group.

Subjects were interviewed in the home, and mothers and children were brought to the University of Chicago campus for testing, when the children were four years old. Follow-up data were obtained from both mother and child when the child was six years of age, and again at seven years.

Principal Investigator for the project is Professor Robert D. Hess, formerly Director, Urban Child Center, University of Chicago, now Lee Jacks Professor of Child Education, School of Education, Stanford University.

Co-Investigator for the follow-up study is Dr. Virginia C. Shipman, Research Associate (Associate Professor) and Lecturer, Committee on Human Development, and Director, Project Head Start Evaluation and Research Center, University of Chicago, who served as Project Director for the pre-school phase of the research.

Dr. Jere Edward Brophy, Research Associate (Assistant Professor), Committee on Human Development, University of Chicago, was Project Director for the follow-up study and participated as a member of the research staff of the pre-school study.

Dr. Roberta Meyer Bear, Research Associate (Assistant Professor), Committee on Human Development, University of Chicago, participated as a member of the research staff during the pre-school and follow-up phases of the project and was in charge of the manuscript preparation during the write-up phase of the research.

Other staff members who contributed greatly to the project include Dr. Ellis Olim (University of Massachusetts, Amherst), who was responsible for the major analysis of maternal language; Dr. David Jackson (Toronto, Ontario), who was involved in early stages of development of categories for the analysis of mother-child interaction, and participated in the processing and analysis of data; Mrs. Dorothy Runner, who supervised the training and work of the home interviewers, acted as a liason with public agencies, and had primary responsibility for obtaining the sample of subjects; and Mrs. Susan Beal, computer programmer.

COGNITIVE ENVIRONMENT STUDY

MANUAL FOR SIGEL CONCEPTUAL STYLE SORTING TASKS *

SUMMER 1967

MOTHER'S SIGEL CONCEPTUAL STYLE SORTING TASK

INTRODUCTION

During the first testing session at the University, mothers were administered the adult form of the Sigel Conceptual Style Sorting Task. Materials were black-and-white paper cutouts of human figures, from the Make-A-Picture-Story Test (MAPS).

ADMINISTRATION

The tester spread the figures randomly on a table, with no obvious groups placed next to one another (e.g., males, females, nudes, uniformed figures, shading, etc.). The subject was instructed:

> YOU SEE BEFORE YOU PICTURES OF PEOPLE. I WANT YOU TO PICK OUT AND PUT INTO ONE GROUP ALL THOSE FIGURES THAT ARE ALIKE OR THE SAME IN ANY WAY OR GO TOGETHER IN SOME WAY. YOU MAY HAVE AS MANY OR AS FEW FIGURES IN YOUR GROUP AS YOU WISH, BUT I JUST WANT YOU TO MAKE ONE GROUP. DO YOU UNDERSTAND? ALL RIGHT. GO AHEAD.

Reaction Time was recorded, beginning immediately after the tester said, "Go ahead." The score was the number of seconds until the subject picked up the first figure.

After the subject had completed a sort, the tester recorded the figures selected and asked:

> WHAT IS THE REASON YOU PUT ALL THESE TOGETHER?

The subject's response was recorded verbatim.

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* This manual is based on the conceptual style sorting task procedures and coding categories developed by Dr. Irving E. Sigel, Director of Research, The Merrill-Palmer Institute, Detroit, Michigan.

The tester than replaced the figures randomly on the table, and said:

ALL RIGHT. NOW I WOULD LIKE YOU TO MAKE ANOTHER GROUPING, TAKING THOSE FIGURES THAT ARE ALIKE OR THE SAME OR GO TOGETHER IN ANY WAY, BUT THIS TIME ON THE BASIS OF A DIFFERENT REASON THAN YOU USED BEFORE. DO YOU UNDERSTAND? ALL RIGHT. GO AHEAD.

Once the sort was made, the subject was asked for a reason. Again, reaction time, the figures selected, and the verbatim response were recorded.

This procedure was repeated until the subject made 12 groupings or sorts. After two or three sorts, instructions were reduced to:

ALL RIGHT. I WOULD LIKE TO MAKE ANOTHER GROUPING BUT AGAIN ON THE BASIS OF A DIFFERENT REASON.

COGNITIVE ENVIRONMENT STUDY

MANUAL FOR SIGEL CONCEPTUAL STYLE SORTING TASKS

SUMMER 1967

CHILD'S SIGEL CONCEPTUAL STYLE SORTING TASK

INTRODUCTION

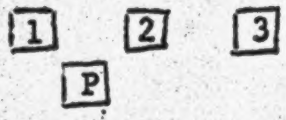
During the second testing session at the University, the four-year-old children were administered the children's form of the Sigel Conceptual Style Sorting Task. Materials included fifteen sets of black-and-white photographs of common objects, animals, and humans, and five sets of black-and-white cut-out paper figures from the Make-A-Picture-Story Test (MAPS). Each set was composed of a presentation picture and three choice pictures:

		Pictures	
Presentation	1	2	3
1. tomato	banana	orange	pear
2. duck	fish	camel	hen
3. chair	dresser	table	rocking chair
4. MAPS #6	MAPS #11	MAPS #9	MAPS #101
5. stagecoach	sailboat	airplane	jeep
6. smiling cowboy	smiling man	neutral policeman	ranch
7. banana	green beans	grapes	celery
8. MAPS #71	MAPS #72	MAPS #3	MAPS #108
9. cow	elephant	horse	sheep
10. bed	cradle	chest	lamp
11. baby	playpen	girl	man
12. bread	tomato	apple	ham slice

13. MAPS #68	MAPS #32	MAPS #31	MAPS #18
14. Truck	dog	horse	sheep
15. ranch	stagecoach	horse	cowboy
16. MAPS #107	MAPS #118	MAPS #5	MAPS #67
17. tractor	engine	rocket ship	boat
18. fireman	fire station	soldier	policeman
19. smiling nurse	neutral nurse	smiling stewardess	sad stewardess
20. MAPS #109	MAPS #112	MAPS #104	MAPS #105

ADMINISTRATION

The presentation picture was placed on a table in front of the child, with three choice pictures immediately above it, aligned horizontally to the child's right (to his left if left-handed):



As the tester pointed to each of the four pictures, the child was asked to name it. His response was recorded, whether correct or not. A wrong label was not corrected, nor was the child given the name if he did not know it.

The tester instructed the child:

TAKE ONE OF THESE (pointing to three choice pictures) THAT BELONGS WITH THIS OR LOOKS LIKE IT (pointing to presentation picture) AND PUT IT WITH THIS ONE (presentation picture; i.e., the child was told to place his choice next to the presentation picture, under #3 in the figure above).

Acceptable alternative wordings of the instructions include:

TAKE (PICK OUT) THE ONE (OF THESE) THAT GOES WITH THIS (ONE), etc.

or

TAKE ONE OF THESE AND PUT IT WITH THIS (THAT) ONE.

the selection was recorded, and the child was asked as the tester indicated the presentation picture and the one the child had selected:

WHY DO THESE GO (BELONG) TOGETHER?

or

WHY DID YOU PICK THIS ONE?

If the child gave no reason, but repeated the labels, or pointed to the pictures, the tester said:

TELL ME ABOUT THESE.

If the child said "because they're the same," the tester asked:

IN WHAT WAY ARE THEY THE SAME?

The tester continued to encourage the child to tell her the basis of his sort, how the figures were the same, why they went together, until the child gave a scorable verbal response, or persisted in a nonscorable or nonverbal response.

"How are they alike?" was not asked, since young children, especially lower-class children, are not as familiar with the word "alike" as they are with "the same" or "goes with".

COGNITIVE ENVIRONMENT STUDY

SCORING MANUAL FOR SIGEL CONCEPTUAL STYLE SORTING TASKS

INTRODUCTION

All subjects in the Cognitive Environment Study -- mothers *and* their four-year-old children -- were administered Sigel Conceptual Style Sorting Tasks during testing sessions at the University. Although the material and instructions differ for the adult and child versions of the task, the formal scoring categories are the same. In each task, the subject is asked to make a "conceptual sort": the child is asked to select one of three items to go with a presentation picture; the mother, to group together two or more figures from a large array. And in each task the subject is asked to explain his sort, to tell why the items go together. The formal coding categories described in this manual apply to that verbal response and refer to the subject's conceptualization of the similarities and relationships among the items constituting a sort. Possible bases for sorts include descriptive or stimulus-centered concepts, relational or functional concepts, and categorical or inferred-class concepts. The subject may offer a verbal response which cannot be scored, such as a disjunctive statement or a vague reference. He may be unable to verbalize the concept, in which case he is credited for having made a sort but receives a score for nonverbal conceptualization; or the subject may be unable to make a sort, in which case he receives a score for a non-sort.

FORMAL SCORING CATEGORIES

1. *Descriptive*: (Stimulus Centered) Concepts which are derived directly from the physical attributes of the stimulus and ones in which the conceptual label contains a direct reference to a physical attribute present in the stimulus. Descriptive responses are of two types: Analytic (Part-whole) and Global.

Descriptive-Analytic or Part-whole:

D-1: Sorts in which the physical attributes or properties of the *materials* presented are the basis of similarity; e.g., color (black and white only), texture, shading, shape, or size.

D-2: Sorts in which the description of physical attributes of the *objects* or *figures* depicted are employed: e.g., heads, legs, wheels, guns, holding objects in their hands, clothing (uniforms, well-dressed, casually dressed, professional dress), baldness, hair color, *static* posture (prone position, sitting position), nudity (lack of clothing, they are nude *but* *not* "These are nudes." Latter considered class of nudes and scored for D-3), crippled or physical disability (physical injury, physical handicap), etc. (smiling, frowning, straight mouths on human figures other than MAPS also included).

Descriptive-Global:

D-3: Sorts in which the label designates the status, occupation, etc. where the cues are manifest in the stimulus; e.g., policeman, soldiers or army men, nurses, nudes, boats, trucks, etc.

D-4: Sorts in which discrete age categories are employed; e.g., children, old people, adults, babies, young people, etc.

D-5: Sorts in which one of the sexes is grouped; e.g., males, females.

D-6: Sorts based on age and sex; e.g., old men, young women, boys, girls, etc.

Descriptive-Analytic or Part-whole (objects only):

D-7: Sorts based on or dealing specifically with the physical attributes or structural material; e.g., wood, plastic, steel, etc. (Does not apply to MAPS figures.)

II. Relational-Contextual: Concepts which are used to tie together (or relate) two or more people or objects. In this category no stimulus is an independent instance of the concept; any one stimulus gets its meaning from a relationship with the other stimuli; e.g., a mental hospital scene, a family scene, the horse pulls the stagecoach. The relationship must be between the stimuli in the subject's sort and not between the stimuli and any external factor brought in by the subject. For example, "These people all belong in a mental hospital" is not scored as relational since there is no hospital present and no interaction among the stimuli in the sort--each stimulus is independent of every other stimulus. However, "This is a mental hospital scene. These are the patients and this is the doctor who is treating them," is scored as relational since no stimulus is an independent instance of concept, "mental hospital scene."

R-1: *Thematic*: Sorts which are based on themes, plots, or stories where no category is used; e.g., he killed this man, she is giving him food, the boy is helping the blind man to cross the street, etc.

R-2: *Geographical*: Sorts in which the instances are related in space--locale, geographic, domiciliary, etc.--where the spatial reference is *not an external factor* but is one of the stimuli in the sort; e.g., the wac and the soldier belong on the army base, these tools belong in the trunk of the car, these animals belong on the ranch.

R-3: *Temporal*: Sorts in which the figures are grouped on the basis of the temporal development of the individual; e.g., this is a person growing up, these are the stages of man; or temporal sequence; e.g., before and after of a crime.

R-4: *Comparative*: Sorts based on comparison between two or more stimuli; e.g., better than this one, different from this one, one is dressed casually and the other formally.

R-5: *Functional*: Sorts in which objects are grouped together on the basis of their interdependent use or function, behavior or activity; e.g., the steam shovel digs sand to put on the truck, sit on a chair to eat at the table, ham and bread are used to make a sandwich, the horse pulls the stagecoach, all these objects make up a home.

R-6: Sorts in which figures are grouped on the basis of an understood relationship state between them.

A. *Kinship*: a family group, husband and wife, mother and child, brother and sister, etc.

B. *Other Relationship States*: Doctor-nurse, teacher-student life drawing class, etc.

R-7: *Conditional*: Sorts in which the stimuli are related conditionally; e.g., if this, then that.

Note: All sub-categories grouped together
Score for "R" in general only.

III. *Categorical-Inferential*: A group of figures or objects are put together where each stimulus in the sort is representative of the total class. These sorts are based on inferred or non-observable characteristics of the stimuli, each instance is not interdependent, and a class label is used--it is an inference. (Note: It must be kept in mind that the categorical response is not necessarily a conceptual one in the Goldstein or Werner sense. What we are dealing with in the following instance, "People ride in these." is a categorical response tied to a concrete reality in contrast to "These are vehicles," which would be a more objectifying and abstracting statement.)

MAPS SORTS (human figures only)

C-1: Sorts in which the figures are grouped on the basis of a common *behavior*, *role*, or *participles* of *action*: e.g., these people all work for a living, these people all do services, these people do something worthwhile or constructive, these people are walking, modeling, sleeping. Also motivational states; they are intent on committing a crime.

C-2: Sorts in which the objects are grouped on the basis of *status*, *class* or *attributes*; e.g., professional people, criminals, handicapped people, dignified people, solemn people, intelligent looking, sick people, invalids, crippled, disabled, incapacitated, handicapped, people who need help, dead people, Negroes, Orientals, Caucasians, military people, these people represent justice or [illegible] tolerance or crime or physical health, these people have a persuasive expression or ordinary expression, suffering people, artistic people, medical people, clergymen.

C-3: Sorts in which the basis of similarity is a moral or aesthetic value or judgment.

A. Aesthetic: pretty, ugly, beautiful, attractive, etc.
B. Moral: good, bad, wicked, evil, "shady" looking character, malicious intentions, etc. (realm of right and wrong.)

C-4: Sorts in which figures are grouped on basis of a common affect or emotion: state; e.g., sad, unhappy, suffering, aggression, hostility, anguish, sorrow, suffering people, crying, violence, etc.

C-5: Sorts in which stimuli are grouped on basis of spatial reference--common locale, geographic, domiciliary, etc.; e.g., These people would all be found in a hospital, these people would all be in the street, or in a mental institution.

C-6: Sorts in which the basis of similarity is a sexual reference other than designation of sex of figures; e.g., these are the sexy ones, sensuousness, girls who think they know about life, look seductive.

HUMAN AND OBJECT SORTS

C-1: Function, Use, or Behavior: (Includes all examples of C-1 for MAPS plus function and use for objects.) Examples are: things to build with, these carry people and freight, they swim in water, used for cutting, we eat these, these are rocking things, used to turn bolts, these are used by people.

C-2: Class-naming: e.g., professional people, homemakers, military men, human beings, furniture, farm animals, land vehicles, ways of transportation, foods.

C-3: Attributes: (Static traits of stimuli are basis of similarity--non-functional, non-action, non-affective states.) Examples: juiciness, tough skins, wildness, these grow on vines, these run by motors, these move on wheel, these are sharp, these are self-propelling, these are manufactured, these are inanimate, these can be eaten without cooking, these people are handicapped, these people can't walk, they are dependent.

C-4: Affect or Emotional State: (Does not apply to object sorts.) This category is the same as C-4 on MAPS with one exception: The terms--smiling, frowning--are scored as D-2 on human figures but as affect on MAPS figures.

C-5: Geographical: (Same as MAPS) These people are found in the home, they belong in the jungle, see them in the zoo, grown on a farm, they go in the water, live on a farm. Note: The spatial reference is not one of the stimuli but is the only basis for the grouping. If there is another basis along with the spatial reference, score for the former; e.g., "These swim in water" or "These are used on a farm" are scored as C-1.

C-6: Value Judgment, moral judgment, or aesthetic judgment: (Same as C-3 on MAPS) For human figures would include: normal faces or normal expressions, look regular, look surprised, serious look on their faces (where specific affect or emotional state cannot be ascertained). Also, these (referring to foods) are good for you, these make you healthy, these (tools) are important for man. Egocentric responses, if they are the only basis for the sort, are included: e.g., I like these.

OBJECT SORTS (objects only)

C-7: Presumed constituent parts or attributes: Basis of similarity is unseen (non-manifest) parts or inferred attributes of stimuli: e.g., seeds, motors, colors other than black and white (the tomato and apple are red), these are solid, etc.

NONSCORABLE RESPONSES

Nonscorable:
Verbal: broad or vague statements: "looks like it", "the same", "just alike"; or disjunctive responses: "this is a truck and this is a horse".

Nonverbal: Subject makes a sort but does not verbalize a rationale; points, puts cards or figures edge-to-edge, on top of each other or otherwise together, or says "Don't know".

Nonsort: Subject is unable or refuses to make a sort.

CHILDREN'S COGNITIVE SORTING TASK
SCORE SHEET

Code________

P	1	2	3	Child's Verbal Response
1. tomato	banana	orange	pear	
2. duck	fish	camel	hen	
3. chair	dresser	table	rocking chair	
4. P-6	11	9	101	
5. stage-coach	sail-boat	airplane	jeep	
6. sm. cowboy	sm. man	n. police	ranch	
7. banana	green beans	grapes	celery	
8. 71	72	3	108	
9. cow	elephant	horse	sheep	
10. bed	cradle	chest	lamp	
11. n. baby	playpen	n. girl	n. man	
12. bread	tomato	apple	ham	
13. 68	32	31	18	
14. truck	dog	horse	sheep	
15. ranch	stage-coach	horse	cowboy	
16. 107	118	5	67	
17. trac-tor	engine	rocket ship	boat	

CHILDREN'S COGNITIVE SORTING TASK
SCORE SHEET --cont.

Code__________

	P	1	2	3	Child's Verbal Response
18.	n. fireman	fire station	n. soldier	n. police	
19.	sm. nurse	n. nurse	sm. steward	sa steward	
20.	109	112	104	105	

COGNITIVE ENVIRONMENT STUDY

MANUAL FOR ADMINISTERING AND SCORING THE CURIOSITY TASK

SUMMER 1967

INTRODUCTION

The four-year-old children in the Cognitive Environment Study sample were administered an experimental measure of curiosity at the second testing session. The stimuli were eight pairs of simple and complex drawings, adapted from those used by Berlyne, Smock and Holt, and the Cantors. The viewing apparatus or "curiosity picture-box" was similar to that used in the Cantors' studies.

PROCEDURE

Sixteen test pictures, preceded by two trial cards, were presented to the child one at a time in a large viewing box: each card was inserted inside the box at the rear, and the child was told to look through a viewing slot at the front of the box. The pressure of the child's head on a bar immediately above the viewing slot operated a light so that the interior of the box was illuminated and the picture could be seen only when the child was leaning his forehead against the bar, looking into the viewing slot. The same mechanism activated a clock. When the child sat back in his chair, moving his head away from the viewing slot, the light went off and the clock stopped. Viewing time was registered on the clock to .01 seconds.

STIMULI

Each of the eight pairs of drawings of common geometric figures, elements, and animals, is composed of a simple and a complex member, defined by the number of objectively observable elements or relationships represented. Each pair is characterized by one of four types of stimulus complexity, as indicated in the illustration. The order of presentation of the 16 cards was counterbalanced for type of complexity and for comlex vs. simple.

ADMINISTRATION

The subject was seated in a child-sized chair, facing the picture-box which was placed on a low table. The examiner sat to the child's right, and perpendicular to the child's line of vision.

The instructions given to the child by the examiner were aimed at accomplishing, in steps, the following:

1. the child understands how to make the light go on;
2. the child understands how to make the light go off and how to keep it on for some time;
3. the child explores the empty box to satiate any motivation toward that object;
4. the child demonstrates, in two trial items, his ability to turn on the light, focus his attention on the drawing inside the box, and turn the light off when he no longer wants to see that item.

The specific instructions given to the child, with auxiliary instructions for children who do not catch on immediately or whose behavior might disrupt the task or distort the performance measures, are listed below in these four steps.

1. NOW WE'RE GOING TO LOOK AT SOME PICTURES. THIS IS A PICTURE-BOX. IT DOESN'T HAVE ANY PICTURES IN IT NOW, BUT I'LL PUT SOME IN FOR YOU TO LOOK AT. NOW, YOU LOOK IN HERE (indicate viewing-slot).

   a. If S doesn't look or looks without pressing forehead against bar: LOOK HARDER. HARDER THAN THAT. LOOK REAL HARD. (etc., until S's head has triggered light).

   b. If S still hasn't caught on, press his head against the bar until light clicks on.

   c. When S turns light on with head: WHAT HAPPENED? WHAT DID YOU DO? YOU MADE A LIGHT GO ON, DIDN'T YOU?

   d. If S still hasn't turned light on, demonstrate: WATCH ME. SEE, I PUT MY EYES RIGHT HERE SO I CAN SEE INTO THE BOX. NOW WATCH (get S' face next to E's) -- SEE, I CAN MAKE THE LIGHT GO ON. NOW YOU DO IT: PUT YOUR HEAD HERE AND MAKE THE LIGHT GO ON.

2. YOU CAN TURN THE LIGHT ON WITH YOUR HEAD, CAN'T YOU? CAN YOU MAKE IT GO OFF? AND ON AGAIN? CAN YOU MAKE IT STAY ON?

   a. If S uses hands: YOU CAN TURN IT ON WITH YOUR HANDS, CAN'T YOU? BUT I WANT YOU TO DO IT WITH YOUR HEAD. PUT YOUR HANDS ON THE TABLE/IN YOUR LAP, AND MAKE THE LIGHT GO ON WITH YOUR HEAD.

   b. If S "plays" with light, clicking it on and off: JUST MAKE IT GO ON AND STAY ON: CAN YOU DO THAT?

3. When S has mastered the light switch: NOW YOU CAN SEE WHAT'S IN THE BOX. YOU CAN LOOK AS LONG AS YOU WANT. IS THERE ANYTHING IN THERE? (Chat with S until he has explored the empty box and seems to be ready for the pictures. Light should be off and clock reset to 0.)

4. NOW I'M GOING TO PUT A PICTURE IN FOR YOU TO LOOK AT. DON'T LOOK UNTIL I SAY READY/OK. WHEN I GET THE PICTURE READY, I'LL SAY READY/OK, AND YOU CAN TURN ON THE LIGHT AND LOOK AS LONG AS YOU WANT. WHEN YOU'RE TIRED OF LOOKING AT THE PICTURE, JUST SIT BACK AND I'LL GIVE YOU ANOTHER ONE.

   a. Insert trial card A: READY/OK.
      When S is through looking and light is off, ARE YOU THROUGH LOOKING AT THAT PICTURE? DO YOU WANT TO LOOK AT IT SOME MORE, OR SHALL I PUT ANOTHER PICTURE IN?

   b. If S says he's through (If S looks again, when he's finished second viewing): remove card; record time; reset clock; OK, NOW I'M GOING TO PUT IN ANOTHER PICTURE (AND THIS TIME LOOK JUST ONCE, FOR AS LONG AS YOU LIKE). WHEN YOU'RE THROUGH LOOKING AT THIS ONE, SIT BACK, AND I'LL GIVE YOU THE NEXT PICTURE.

c. Insert trial card B: READY/OK.
When S is through looking, remove card, record time, reset clock. NOW YOU CAN LOOK AT THIS PICTURE AS LONG AS YOU LIKE. JUST SIT BACK WHEN YOU'RE THROUGH WITH IT.

d. Insert card 1. Repeat c., above, if necessary, for any of the cards. Always say, "READY" or "OK" when a card has been inserted, to get S used to not looking before the card is in place.

SCORING

Two types of scores were obtained from the recorded total viewing time for each picture: total viewing scores, and proportion scores indicating relative preference for complex or simple items.

Total Viewing Time: the total number of seconds (to .01 seconds) for all sixteen cards; subscores for Total Viewing Time include the Total Complex Time or total number of seconds viewing the eight complex items; and Total Simple Time or the total time viewing the eight simple items.

Curiosity Proportion scores included, for each pair, the ratio of time viewing the complex member to the total time spent on both members of the pair (complex / complex + simple); for each type of stimulus complexity, a mean proportion score was obtained by summing the proportion scores for the two pairs representing that type of complexity, and dividing by two (e.g., pair 2 proportion + pair 6 proportion, divided by two, gives the average proportion score for Incongruity). Finally, an overall curiosity ratio score was obtained by dividing the Total Complex Time by Total Viewing Time. This score is again complex / complex + simple, a summary statement across all 8 pairs without, however, giving equal weight to each pair: it is not the average of the 8 proportion scores.

SEARS SEX PREFERENCE SCORE SHEET

Score (0 to 8) ________________________________ Name ____________________

I'll show you two pictures and you get to pick one of them. Here's one. Which do you like best?

(Practice	M		F	score
	1 (blocks)	x	5 (workbench)	________
	1 (blocks)	x	3 (tea)	________
	6 (car)	x	4 (dress)	________
	2 (cowboy)	x	7 (cook)	________
	6 (car)	x	8 (wash)	________
	5 (bench)	x	8 (wash)	________
	1 (blocks)	x	7 (cook)	________
	2 (cowboy)	x	4 (dress)	________
	5 (bench)	x	3 (tea)	________
(practice)	2 (cowboy)	x	6 (car)	________

COGNITIVE ENVIRONMENT STUDY

Mother's Code___________

Listed below are five objects. Your task is to write down as many different uses as you can for each object. Several examples are given in each case. You will have approximately 15 minutes. Be sure to write down some uses for each object. Write down anything that comes to mind, no matter how strange it may seem.

1. BRICKS Build houses, doorstop,

2. PENCILS Write, bookmark,

3. PAPER CLIPS Clip paper together, make a necklace,

4. TOOTH PICKS Clean teeth, test cake,

5. SHEET OF PAPER Write on, make an airplane

DOLL PLAY

Show child the dolls, labeling them as they are shown.

THIS IS THE TEACHER, THIS IS THE FATHER, THIS IS THE MOTHER, AND THESE ARE THE CHILDREN AND THEY ARE ALL IN THE SECOND GRADE.

Place dolls in front of E so that they face the S.
Note any comments or reactions of S to the dolls on the recording sheet.

Speak slowly - be sure you have the child's attention.

I'D LIKE YOU TO MAKE UP A STORY ABOUT SCHOOL. YOU CAN USE SOME OR ALL THE DOLLS TO HELP YOU TELL THE STORY IF YOU WANT TO. BUT I WANT YOU TO TELL ME SOMETHING THAT MIGHT BE HAPPENING IN SCHOOL.

If S asks if he can or has to use all the dolls tell him it's up to him, that he can use as many as he wants to.--WHAT I WANT YOU TO DO IS TO MAKE UP A STORY ABOUT SOMETHING HAPPENING IN SCHOOL.

Probes
"WHAT'S GOING ON" "TELL ME MORE ABOUT IT" "THEN WHAT HAPPENS"

After first spontaneous verbalization wait--if child doesn't go on ask him to tell you more about it--then ask about feelings, endings, etc.

After story ask "why" questions, to find out about unexplained emotional reactions, etc.

Try to get an ending to the story.

Recording:

Record verbatim what the child says, describe all actions to dolls, especially when S is not verbalizing.